

A NEW STHENURINE KANGAROO (MARSUPIALIA, MACROPODIDAE) FROM SOUTHEASTERN SOUTH AUSTRALIA

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Summary

WELLS, R. & MURRAY, P. (1979) A new Sthenurine kangaroo (Marsupialia, Macropodidae) from southeastern South Australia, *Trans. R. Soc. S. Aust.* **103**(8), 213-219, 30 November, 1979.

A new microdont species of *Sthenurus*, similar in size to *S. occidentalis*, with molar teeth resembling those of *S. gilli* is described from Pleistocene cave deposits in southeastern South Australia.

Introduction

Excavation of the extensive vertebrate fossil deposits at Victoria Fossil Cave, Naracoorte, South Australia (Wells 1975) is yielding large numbers of extinct Sthenurine kangaroos including *Procoptodon rapha* (Owen), *Sthenurus browni* Merrilees, *S. occidentalis* Glauert, *S. gilli* Merrilees, *S. atlas* Owen, *S. cf. andersoni* Marcus and a new form not compatible with those reviewed by Bartholomai (1963) and Tedford (1966) or described by Marcus (1962) and Merrilees (1965, 1967).

The new species is named *Sthenurus maddocki* in memory of the late Ernest Maddock, past Director of National Pleasure Resorts and President of the Cave Exploration Group of South Australia, in recognition of his efforts in initiating the concept of the Victoria Fossil Cave tourist complex.

Methods

Mensuration follows Tedford (1966). All dimensions are in mm $\bar{x} \pm$ S.D. L = length; AW = anterior width protoloph (id); PW = posterior width metaloph, hypolophid. The dental nomenclature of Archer (1978) has been noted; that of Tedford (1966) has been retained.

Lower jaws have been associated with the skull by a process of elimination based on tooth dimensions, general morphology and occurrence in the same stratigraphic horizon.

All referred specimens are deposited in the South Australian Museum (SAM).

Diagnosis

Skull: Similar to *Sthenurus occidentalis* Glauert (1910) and *S. browni* Merrilees (1967), but differing in the greater lateral expansion of the frontals.

Mandible: Similar to but larger than that of *S. gilli* Merrilees (1965); mandibular symphysis long with a pronounced median dorsal groove and lacking the postero-ventral shelf of *S. gilli* and *S. occidentalis*.

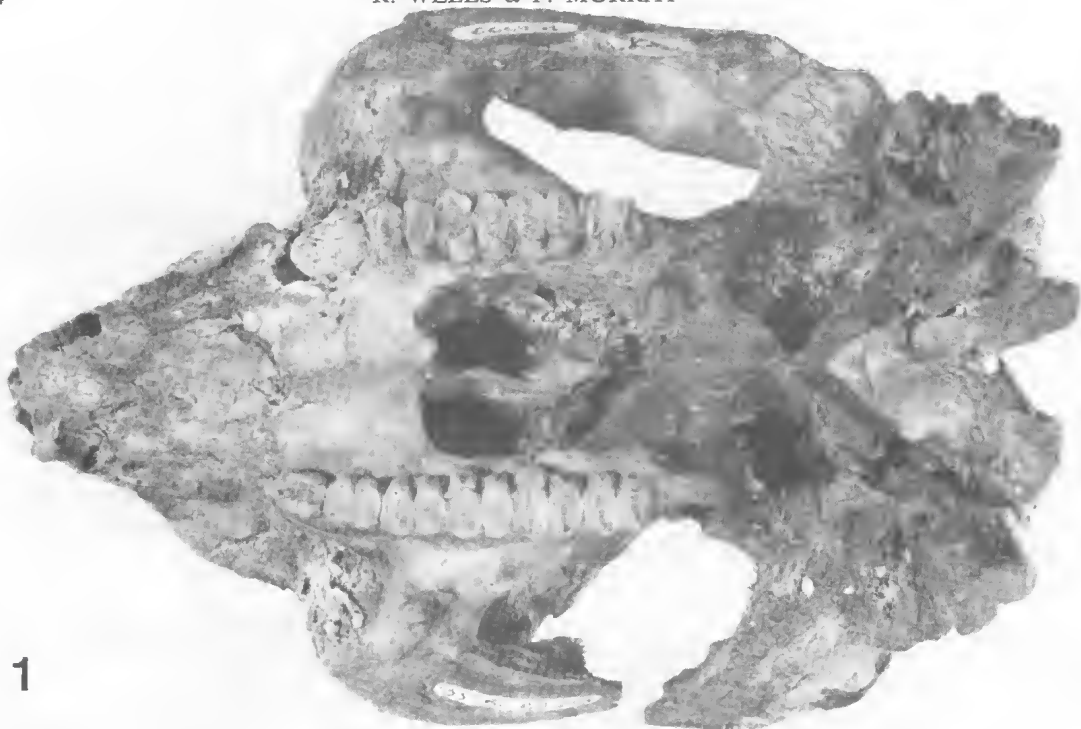
Dentition: Smaller than *S. occidentalis* or *S. browni*; similar to, but larger than, *S. gilli*; I_1^1 narrow, lanceolate and procumbent; P_3^2 narrower in length relative to *S. gilli* with labial crest separated anteriorly from lingual crest by a deep cleft; lophs of M_3^2 directed antero-lingually, rather than at right-angles to sagittal plane as in *S. gilli*, *S. occidentalis* and *S. browni*.

Sthenurus (Simosthenurus) maddocki sp. nov.
Holotype: SAM P16999. Skull, partially compressed and containing complete, little-worn cheek dentition including P_2^2 , Dp_3^2 , M_1^{1-4} .

Paratypes: SAM P16627. Left and right ramus of an adult mandible, fused at the symphysis including I_1^1 , P_3^2 , M_1^{1-4} , but lacking right coronoid process and condyle and portion of left condyle. SAM P16513. Complete right ramus of juvenile including I_1^1 , P_2^2 , Dp_3^2 ,

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Figs 1-2. *Sthenurus maddocki*; Holotype, SAM P16999. 1. Palatal aspect (slightly distorted due to crushing); 2. Dorsal aspect. Note inflated frontal.

$M_{1,2,3}$ and M_4 alveolus. SAM P16673. Adult mandible including I_1 , P_3 , M_{1-4} , missing left and right coronoid processes and anterior portion of P_3 . SAM P16548. Fragmentary left mandible including I_1 , P_3 , $M_{1,2,3}$ missing ascending ramus and ventral portion of mandible.

Type locality: Victoria Fossil Cave, Naracoorte, South Australia.

Age: Late Pleistocene.

Description and Comparison

Skull: (Figs. 1, 2) brachycephalic with exceedingly inflated frontal sinus produced by lateral expansion of anterior portion of frontal bones. This expansion cannot be attributed to the slight compression and distortion of this specimen. Facial region and diastema short as in *S. occidentalis*. Premaxillary extends antero-ventrally as prominent horizontal shelf bearing V-shaped array of incisor alveoli. Nasal opening, bounded laterally by narrow vertical wing of premaxillary, is broader than in *S. occidentalis* and similar to *S. browni*. Only collapsed right nasal is present on holotype; broad and oblate posteriorly, tapering to a fine point anteriorly, which in an undamaged specimen would extend well forward of lateral border of nares. Facial surface of maxillary narrow but not as deep vertically as in *S. occidentalis* and *S. browni*. Masseteric processes formed mainly by maxillary, short, blade-like, lack prominent lateral expansion evident in *S. occidentalis* and *S. browni*.

Orbit more enclosed by overhanging post-orbital process of frontal than in *S. occidentalis*, *S. browni* or *S. gilli*. Jugal forms broad base and posterior margin to orbital rim. Deep zygomatic process of squamosal similar to that of *S. occidentalis* and *S. browni*.

Large palatine vacuities extend anteriorly to a point opposite median valley of M_1 . Sufficient of left palatine bar remains to indicate weak structure similar to that of *S. occidentalis* and *S. gilli*.

Small, paired, incisive foramina open on to palate opposite posterior border of I_2 alveoli. Palate has shallow median groove extending from incisive foramina, posteriorly to point opposite anterior root of P_2 . This groove flanked on each side by broad depressions extending from incisive foramina to anterior border of palatine vacuities. Diastema short, I_2 alveolus — P_2 30.0 mm, representing 26% of palatal length (*S. occidentalis* 25%, *Procop-*

odon goliah 25%; data derived from Tedford 1967). Cranium shows some elevation above plane of palate, not as pronounced as in *S. occidentalis*, although similar to *S. gilli*. Top of cranium narrow relative to frontal portion of skull, has two temporal lines which arise anteriorly from parietals near frontal-parietal suture and extend posteriorly to converge as sagittal crest. Although somewhat distorted by crushing, occipital region broad with relatively short paroccipital processes.

TABLE 1
Measurements of skull of Sthenurus maddocki

Condylobasal length, ant. edge I_1 alveolus to left post. edge occip. cond.	mm 190
Max. width across frontal	100.7
Bizygomatic width	127.7
Width across paroccipital processes	82.7
Palatal length post. edge pal. bar to ant. edge I_2 alveolus	115
Palatal width at ant. root M_1	35.4
Palatal width at ant. root M_2	35.8
Diastema length I_2 P_2	30

Upper Incisors: Upper incisors missing from holotype. However size of alveoli for these teeth indicate that I_1 and I_2 are similar in size while I_2 is very small.



Fig. 3. A. Stereopair of P_2 , Holotype, SAM P16999. B. Stereopair of P_3 , Paratype, SAM P16627.



Figs 4-5. *Sthenurus maddocki* mandibles. 4. Dorsal aspect; 5. Lateral aspect.

p_2^2 : A subrectangular tooth (L 9.4, AW 7.1, PW 8.1) narrower but similar in length to Dp_2^2 . Possesses high labial crest and low lingual crest. The shallow longitudinal basin enclosed by these crests crossed by fine ridglets and, posteriorly, by single transverse ridge. Labial crest divided into three cusps by series of vertical grooves that extend down labial face of crown.

p_2^2 : Left p_2^2 (Fig. 3a) has been exposed in its crypt by removing p_2^2 Dp_2^2 . It is a large subrectangular tooth (L 16.2, AW 8.3, PW 10.1) bearing an enclosed longitudinal basin, flanked by parallel labial and lingual crests which in unworn specimen converge anteriorly and posteriorly. Longitudinal basin is crossed by transverse laminae and filled with plicae. Labial crest behind anterior cusp divided into series of cusps by vertical grooves on labial face of crown. Posterolabial side of tooth features prominent cusp similar to that found in *S. occidentalis*.

Dp_2^2 : Completely molariform, similar in proportion though smaller than M_1 (L 9.7, AW 8.5, PW 8.6).

Upper molars: Molar tooth rows gently recurved, converging anteriorly and posteriorly, with greatest width of palate occurring across protoloph of M_2 and M_3 . A similar curvature of the molar tooth row occurs in the undistorted lower jaw.

Upper molars increase in size from M_1 to M_3 .

TABLE 2
Measurements of upper molars of *S. maddocki*,
P16999

	M_1	M_2	M_3	M_4
L	11.0	11.3	11.7	10.6
AW	10.2	12.1	12.2	10.8
PW	10.1	10.7	10.7	9.2

Molars are broader across protoloph than metaloph; this condition most marked in M_1 . Low-crowned, trenchant lophs convex anteriorly and separated by a broad median valley. Anterior faces of lophs finely crenellate, while the posterior faces are more coarsely ornamented.

Well developed anterior cingulum extends labially and ventrally to apex of paracone. An incipient mid-link is formed from a weak crest descending posteromedially from protocone. Median valley falls away in a deep groove to base of crown on lingual side of mid-link. A narrow post-link arises from apex of hypocone, descending labially to base of metacone.

Lower Jaw: Mandibles (Figs. 4, 5) short and stout, similar to *S. occidentalis*, but with pronounced distal upward curving of tooth row. Long and gentle sloping symphysis, extending to point opposite posterior root of P_3 , lacks postero-ventral shelf characteristic of *S. gilli* and *S. occidentalis* (Fig. 6). Two elongate pits for insertion of genial musculature occur on lingual and posterior portion of symphysis, and a median dorsal groove extends anteriorly to incisor alveoli. Anterior mental foramen opens ahead of P_3 and below groove for buccinator musculature. Buccinator groove a prominent feature in Simosthenurines (Murray & Wells in prep.), arises at incisor alveolar border, sweeps posteriorly in a shallow arc above mental foramen and descends to point below anterior root of M_2 . Posterior mental foramen opens in mid-labial aspect of mandible below anterior root of M_3 . Digastric sulcus begins below the anterior root of M_3 , is deep dorso-ventrally and similar in form to that of *S. occidentalis*, and not as pronounced as in *S. browni*. Anterior root of ascending ramus lies opposite anterior part of M_4 , as in *S. gilli*

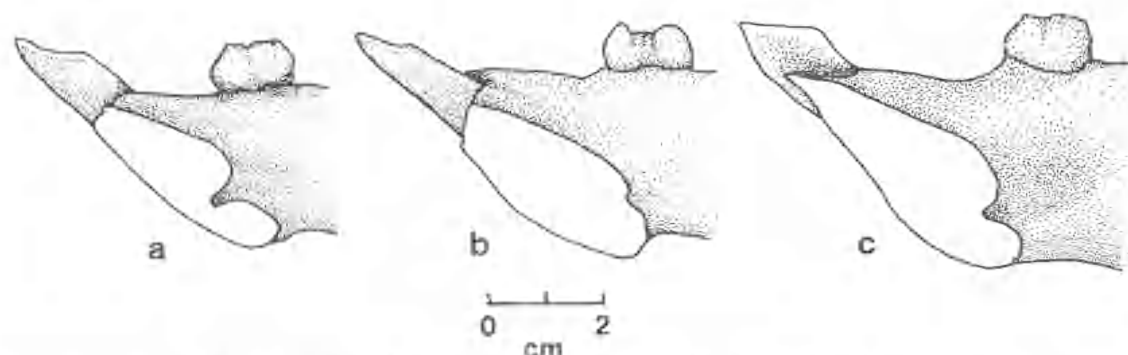


Fig. 6. Symphyseal union; A. *S. gilli*; B. *S. maddocki*; C. *S. occidentalis*.

and *S. occidentalis*. Angular process preserved only in juvenile mandible (P16513). It rises at right angles to mandible and is perfectly straight in both lateral and anterior aspects; a condition similar to *S. occidentalis*.

Lower incisors: Narrow (width at alveolar margin $\bar{x}$ 6.43 $\pm$ 0.63, *n* 4) lanceolate and more procumbent than in *S. gilli*, *S. browni* or *S. occidentalis*. They have a tapered crown and nearly horizontal occlusal plane.

P₅: Smallest tooth in lower dentition (L 7.8, AW 4.8, PW 5.8). A prominent anterior cusp gives rise to lingual crest with two small cusps. A weak labial crest encloses small longitudinal basin. There is an incipient development of a postero-labial cusp.

P₆: (Fig. 3b) is a highly distinctive feature of *S. maddocki*. It is narrower relative to length than in either *S. gilli*, *S. browni* or *S. occidentalis* ($\bar{x}$ L 15.9 $\pm$ 0.3, AW 6.3 $\pm$ 0.72, PW 8.2 $\pm$ 0.69, *n* 3) and labial crest is separated anteriorly from lingual crest by deep cleft. Descending from prominent anterior cusp, lingual crest is divided into four cusps by vertical grooves in lingual face of crown, and from these ascends postero-lingual cusp. Arising from base of postero-lingual cusp, short labial crest arcs dorsally and labially to the postero-labial cusp, terminating abruptly to leave an anteriorly open median valley. The median valley is traversed by series of small ridglets.

TABLE 3

Measurements of lower molars of *S. maddocki*

	M ₁	M ₂	M ₃	M ₄
<i>n</i>	4	4	4	2
L	10.3	11.13	12.03	11.75
	± 0.29	± 0.48	± 0.05	± 0.07
AW	8.23	9.28	10.15	10.20
	± 0.21	± 0.21	± 0.30	± 0.28
PW	8.58	9.33	9.83	9.45
	± 0.15	± 0.26	± 0.26	± 0.21

Dp₅: A small low crowned molariform tooth similar in form to the remaining molars (L 8.2, AW 7.0, PW 7.3).

Lower molars: Molar tooth row curved progressively more medially in the sequence M₁ to M₄, while lophs of individual teeth show progressively more antero-mesial rotation in sequence M₁ — M₄. Lower molars increase in size from M₁ — M₃, then decrease to M₄; they are similar in structure.

Anterior cingulum broad antero-posteriorly but does not extend across full width of tooth. Forelink originates labially just below apex of protolophid, descending to meet anterior cingulum labiad of midline. Slightly weaker midlink arises labially just below apex of hypolophid, descending median valley labiad of midline. No posterior cingulum. Anterior faces of lophs more heavily crenellated than posterior faces; condition being most marked in unworn juvenile (P16513).

Comments

Except for the greatly expanded frontal regions, the skull of *S. maddocki* superficially resembles that of *S. occidentalis*. Yet even without the frontal region, it is easily distinguished by its smaller molar teeth. The mandibles resemble those of *S. occidentalis*, although a cursory glance at the molars also suggests *S. gilli*. However closer examination of the distinctive P₅, the symphysis, and/or the incisors immediately distinguishes it from these species. The functional aspects of the morphological differences will be discussed elsewhere (Wells & Murray in prep.).

All referred specimens are from the Victoria Fossil Cave complex, but *S. maddocki* recently has been recovered by one of us (Wells) from a submerged cave at Tantanolua in southeast South Australia.

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